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S3	272	(map\$ near2 model) same (texture near2 map\$)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/03 12:18
S4	246	(map\$ near2 model) same (texture near2 map\$) and (3d or 3-d or three-dimension\$ or 3-dimension\$)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/03 13:23
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S6	6	("6469710" "6281904" "6057850"). pn. and (convert\$ or compar\$ or comput\$ or average or select or texture or map\$ or smooth\$ or continuous or restor\$)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/03 13:09
S7	6	("6469710" "6281904" "6057850"). pn. and (convert\$ or compar\$ or comput\$ or average or select or texture or map\$ or smooth\$ or continuous or restor\$ or intensity)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/03 13:10
S8	2	("6469710" "6281904" "6057850"). pn. and (convert\$ or compar\$ or comput\$ or average or select or texture or map\$ or smooth\$ or continuous or restor\$ or intensity) and polygon	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/03 13:10
S9	2	("6469710" "6281904" "6057850"). pn. and (convert\$ or compar\$ or comput\$ or average or select or texture or map\$ or smooth\$ or continuous or restor\$ or intensity) and polygon\$	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/03 13:23

S10	2	("6469710" "6281904" "6057850"). pn. and (convert\$ or compar\$ or comput\$ or average or select or texture or map\$ or smooth\$ or continuous or restor\$ or intensity) and (primitive or polygon\$)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/03 13:23
S11	14	(map\$ near2 model) same (texture near2 map\$) and (3d or 3-d or three-dimension\$ or 3-dimension\$) and ((polygon\$ or primitive) near4 overlap\$)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/03 14:06
S12	2	"5929866".pn.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/03 13:33
S13	14	((map\$ near2 model) same (texture near2 map\$)) and (3d or 3-d or three-dimension\$ or 3-dimension\$) and ((polygon\$ or primitive) near4 overlap\$)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/03 14:06
S14	87	(texture near2 map\$) and (3d or 3-d or three-dimension\$ or 3-dimension\$) and ((polygon\$ or primitive) near4 overlap\$) and (blend\$4 or smooth\$4) and intensity	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/06 09:50
S15	320	382/293.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/06 09:50
S16	150	382/293.ccls. and (texture or map\$)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/06 09:50
S17	14	382/293.ccls. and (texture near4 map\$)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/06 11:03
S18	4	(texture near2 map\$4) and (overlap\$4 near2 polygon\$1) and (smooth\$ near2 textur\$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:14
S19	53	(texture near2 map\$4) and (overlap\$4 near2 polygon\$1) and (smooth\$)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:15

S20	1	(texture near2 map\$4) and (overlap\$4 near2 polygon\$1) and (smooth\$) and (statistic\$5 near5 intensity)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:15
S21	1	(texture near2 map\$4) and (overlap\$4 near2 polygon\$1) and (statistic\$5 near5 intensity)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:15
S22	7	(texture near2 map\$4) and (overlap\$4 near2 polygon\$1) and (statistic\$5 sameintensity)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:16
S23	2	(texture near2 map\$4) and (overlap\$4 near2 polygon\$1) and (statistic\$5 same intensity)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:18
S24	24	(texture near2 map\$4) and (overlap\$4 near2 polygon\$1) and ((average or statistic\$5) same intensity)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:19
S25	8	(texture near2 map\$4) and (overlap\$4 near2 polygon\$1) and ((average or statistic\$5) same intensity) and (adjust\$ near5 intensity)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:19
S26	176	382/285.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:27
S27	4104	345/419-427.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:28
S28	0	382/285.ccls. and (((statistic\$ or average) near5 adjust) near4 intensity)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:29
S29	0	345/419-427.ccls. and (((statistic\$ or average) near5 adjust) near4 intensity)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:29

S30	44	345/419-427.ccls. and ((statistic\$ or average) near4 intensity)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:29
S31	9	382/285.ccls. and ((statistic\$ or average) near4 intensity)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:30
S32	1	345/419-427.ccls. and (overlap\$ same ((statistic\$ or average) near4 intensity))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:29
S34	0	382/285.ccls. and (overlap\$ same ((statistic\$ or average) near4 intensity))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:30
S35	1515	("345"/\$ or "382"/\$).ccls. and ((statistic\$ or average) near4 intensity)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:36
S36	11	("345"/\$ or "382"/\$).ccls. and ((statistic\$ or average) near4 intensity) and (overlap\$ near4 polygon\$)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:44
S37	247	("345"/\$ or "382"/\$).ccls. and ((statistic\$ or averag\$) near4 (lightness or brightness or lumin\$ or intensity)) and (overlap\$ near4 (region or triangle or polygon\$))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/02/01 11:47
S38	236	S37 not S36	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/01/31 14:46
S39	35	("345"/\$ or "382"/\$).ccls. and ((statistic\$ or averag\$) near4 (lightness or brightness or lumin\$ or intensity)) and (overlap\$ near4 (region or triangle or polygon\$)) and polygon and textur\$	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/02/01 13:10
S40	429	(chou-hong\$ or chen-chia\$).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/02/01 13:11

S41	8	(chou-hong-long\$ or chen-chia-chen\$).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/02/01 14:12
S42	1	(chou-hong-long\$).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/02/01 14:13

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(overlap <and> polygon)

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1 Sampling from spatial databases*Olken, F.; Rotem, D.;*

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2 Time efficient method for MOS circuit extraction*Doerffer, K.; Anton, O.; Mlynski, D.A.;*

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3 Autonomous mobile robot global motion planning and geometric beam collection using traversability vectors*Janet, J.A.; Luo, R.C.; Kay, M.G.;*

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8 RSVP: a geometric toolkit for controlled repair of solid models

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9 Aperiodic tiling [computer graphics]

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11 Accurate rendering by subpixel addressing*Lathrop, O.; Kirk, D.; Voorhies, D.;*

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12 Partitioning polyhedral objects into nonintersecting parts*Segal, M.; Sequin, C.H.;*

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13 A novel approach in the determination of visible surfaces in 3D vector geometries for ray-optical wave propagation modelling*Maurer, J.; Drumm, O.; Didascalou, D.; Wiesbeck, W.;*

Vehicular Technology Conference Proceedings, 2000. VTC 2000-Spring Tokyo.
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14 Combined affine and translational motion compensation scheme using triangular tessellations*Bradshaw, D.B.; Kingsbury, N.G.;*

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15 Repairing CAD models*Barequet, G.; Kumar, S.;*

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16 A vision system to identify occluded industrial parts*Koch, M.; Kashyap, R.;*

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20 **A framework for fast and accurate collision detection for haptic interaction**

Gregory, A.; Lin, M.C.; Gottschalk, S.; Taylor, R.;

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21 **Benchmarking page segmentation algorithms**

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1 [Status report of the graphic standards planning committee](#)

Computer Graphics staff

August 1979 **ACM SIGGRAPH Computer Graphics**, Volume 13 Issue 3Full text available: pdf(15.01 MB) Additional Information: [full citation](#), [references](#), [citations](#)**2** [Translucent patches—dissolving windows](#)

Axel Kramer

November 1994 **Proceedings of the 7th annual ACM symposium on User interface software and technology**Full text available: pdf(1.28 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

This paper presents motivation, design, and algorithms for using and implementing translucent, non-rectangular patches as a substitute for rectangular opaque windows. The underlying metaphor is closer to a mix between the architects yellow paper and the usage of white boards, than to rectangular opaque paper in piles and folders on a desktop. Translucent patches lead to a unified view of windows, sub-windows and selections, and provide a base from which the tight connection between ...

Keywords: interaction techniques, interface metaphors, irregular shapes, pen based interfaces, translucency

3 [Three-dimensional object recognition](#)

Paul J. Besl, Ramesh C. Jain


March 1985 **ACM Computing Surveys (CSUR)**, Volume 17 Issue 1Full text available: pdf(7.76 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

A general-purpose computer vision system must be capable of recognizing three-dimensional (3-D) objects. This paper proposes a precise definition of the 3-D object recognition problem, discusses basic concepts associated with this problem, and reviews the relevant literature. Because range images (or depth maps) are often used as sensor input instead of intensity images, techniques for obtaining, processing, and characterizing range data are also surveyed.

4 Three-dimensional medical imaging: algorithms and computer systems

M. R. Stytz, G. Frieder, O. Frieder

December 1991 **ACM Computing Surveys (CSUR)**, Volume 23 Issue 4

Full text available:  [pdf\(7.38 MB\)](#)


Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#), [review](#)

Keywords: Computer graphics, medical imaging, surface rendering, three-dimensional imaging, volume rendering

5 The office of the future: a unified approach to image-based modeling and spatially immersive displays

Ramesh Raskar, Greg Welch, Matt Cutts, Adam Lake, Lev Stesin, Henry Fuchs

July 1998 **Proceedings of the 25th annual conference on Computer graphics and interactive techniques**

Full text available:  [pdf\(2.00 MB\)](#)


Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

Keywords: autocalibration, calibration, depth, display, image-based modeling, image-based rendering, intensity blending, projection, range, reflectance, spatially immersive display, virtual environments

6 Shading models for point and linear sources

Tomoyuki Nishita, Isao Okamura, Eihachiro Nakamae

April 1985 **ACM Transactions on Graphics (TOG)**, Volume 4 Issue 2

Full text available:  [pdf\(3.29 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)


The degree of realism of the shaded image of a three-dimensional scene depends on the successful simulation of shading effects. The shading model has two main ingredients, properties of the surface and properties of the illumination falling on it. Most previous work has concentrated on the former rather than the latter. This paper presents an improved version for generating scenes illuminated by point and linear light sources. The procedure can include intensity distributions for p ...

Keywords: lighting simulation, luminous intensity distribution

7 A distributed graphics system for large tiled displays

Greg Humphreys, Pat Hanrahan

October 1999 **Proceedings of the conference on Visualization '99: celebrating ten years**

Full text available:  [pdf\(2.14 MB\)](#)


Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Recent interest in large displays has led to renewed development of tiled displays, which are comprised of several individual displays arranged in an array and used as one large logical display. Stanford's "Interactive Mural" is an example of such a display, using an overlapping four by two array of projectors that back-project onto a diffuse screen to form a 6' by 2' display area with a resolution of over 60 dpi. Writing software to make effective use of the large display space ...

8 Color gamut mapping and the printing of digital color images

Maureen C. Stone, William B. Cowan, John C. Beatty

October 1988 **ACM Transactions on Graphics (TOG)**, Volume 7 Issue 4

Full text available:  pdf(6.06 MB)


Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

Principles and techniques useful for calibrated color reproduction are defined. These results are derived from a project to take digital images designed on a variety of different color monitors and accurately reproduce them in a journal using digital offset printing. Most of the images printed were reproduced without access to the image as viewed in its original form; the color specification was derived entirely from calorimetric specification. The techniques described here are not specific ...

9 A two-and-a-half-D motion-blur algorithm

Nelson L. Max, Douglas M. Lerner

July 1985 **ACM SIGGRAPH Computer Graphics , Proceedings of the 12th annual conference on Computer graphics and interactive techniques**, Volume 19 Issue 3

Full text available:  pdf(4.15 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)


Algorithms are presented for raster and vector motion blur, which produce images and masks suitable for combination by the 2 1/2-D compositing process. The raster algorithm is based on a "skew, blur, unskew" scheme, using a very efficient one-dimensional blurring algorithm. The vector algorithm extends the ideas of anti-aliased scan conversion to motion blur.

Keywords: compositing, computer animation, mask, motion blur, raster, skew, vector

10 Prefiltered antialiased lines using half-plane distance functions

Robert McNamara, Joel McCormack, Norman P. Jouppi

August 2000 **Proceedings of the ACM SIGGRAPH/EUROGRAPHICS workshop on Graphics hardware**

Full text available:  pdf(2.53 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We describe a method to compute high-quality antialiased lines by adding a modest amount of hardware to a fragment generator based upon half-plane edge functions. (A fragment contains the information needed to paint one pixel of a line or a polygon.) We surround an antialiased line with four edge functions to create a long, thin, rectangle. We scale the edge functions so that they compute signed distances from the four edges. At each fragment within the antialiased line, the four distances ...

Keywords: antialiasing, graphics accelerators, prefiltering

11 iLamps: geometrically aware and self-configuring projectors

Ramesh Raskar, Jeroen van Baar, Paul Beardsley, Thomas Willwacher, Srinivas Rao, Clifton Forlines

July 2003 **ACM Transactions on Graphics (TOG)**, Volume 22 Issue 3

Full text available:  pdf(18.68 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Projectors are currently undergoing a transformation as they evolve from static output devices to portable, environment-aware, communicating systems. An enhanced projector can determine and respond to the geometry of the display surface, and can be used in an ad-hoc cluster to create a self-configuring display. Information display is such a prevailing part of everyday life that new and more flexible ways to present data are likely to have significant impact. This paper examines geometrical issue ...

Keywords: ad-hoc clusters, augmented reality, calibration, projector, quadric transfer, seamless display

12 Fast and accurate hierarchical radiosity using global visibility

Frédo Durand, George Drettakis, Claude Puech

April 1999 **ACM Transactions on Graphics (TOG)**, Volume 18 Issue 2

Full text available:  [pdf\(8.48 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Recent hierarchical global illumination algorithms permit the generation of images with a high degree of realism. Nonetheless, appropriate refinement of light transfers, high quality meshing, and accurate visibility calculation can be challenging tasks. This is particularly true for scenes containing multiple light sources and scenes lit mainly by indirect light. We present solutions to these problems by extending a global visibility data structure, the Visibility Skeleton. This extension ...



Keywords: discontinuity meshing, form factor calculation, global illumination, global visibility, hierarchical radiosity, hierarchical triangulation, perception

13 Eliminating popping artifacts in sheet buffer-based splatting

Klaus Mueller, Roger Crawfis

October 1998 **Proceedings of the conference on Visualization '98**

Full text available:

 [pdf\(1.23 MB\)](#) 

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

[Publisher Site](#)

14 Making faces

Brian Guenter, Cindy Grimm, Daniel Wood, Henrique Malvar, Fredric Pighin

July 1998 **Proceedings of the 25th annual conference on Computer graphics and interactive techniques**

Full text available:  [pdf\(1.70 MB\)](#)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

15 Illustrating smooth surfaces

Aaron Hertzmann, Denis Zorin

July 2000 **Proceedings of the 27th annual conference on Computer graphics and interactive techniques**

Full text available:  [pdf\(7.27 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [citations](#), [index terms](#)

We present a new set of algorithms for line-art rendering of smooth surfaces. We introduce an efficient, deterministic algorithm for finding silhouettes based on geometric duality, and an algorithm for segmenting the silhouette curves into smooth parts with constant visibility. These methods can be used to find all silhouettes in real time in software. We present an automatic method for generating hatch marks in order to convey surface shape. We demonstrate these algorithms with a drawing s ...

Keywords: direction fields, hatching, non-photorealistic rendering, pen-and-ink illustration, silhouettes

16 Texture mapping 3D models of real-world scenes

Frederick M. Weinhaus, Venkat Devarajan

December 1997 **ACM Computing Surveys (CSUR)**, Volume 29 Issue 4

Full text available:  pdf(1.98 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#), [review](#)

Texture mapping has become a popular tool in the computer graphics industry in the last few years because it is an easy way to achieve a high degree of realism in computer-generated imagery with very little effort. Over the last decade, texture-mapping techniques have advanced to the point where it is possible to generate real-time perspective simulations of real-world areas by texture mapping every object surface with texture from photographic images of these real-world areas. The technique ...

Keywords: anti-aliasing, height field, homogeneous coordinates, image perspective transformation, image warping, multiresolution data, perspective projection, polygons, ray tracing, real-time scene generation, rectification, registration, texture mapping, visual simulators, voxels

17 Non-photorealistic rendering: Fast primitive distribution for illustration

Adrian Secord, Wolfgang Heidrich, Lisa Streit

July 2002 **Proceedings of the 13th Eurographics workshop on Rendering**

Full text available:  pdf(1.64 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

In this paper we present a high-quality, image-space approach to illustration that preserves continuous tone by probabilistically distributing primitives while maintaining interactive rates. Our method allows for frame-to-frame coherence by matching movements of primitives with changes in the input image. It can be used to create a variety of drawing styles by varying the primitive type or direction. We show that our approach is able to both preserve tone and (depending on the drawing style) high ...

18 Merging and transformation of raster images for cartoon animation

Bruce A. Wallace

August 1981 **ACM SIGGRAPH Computer Graphics , Proceedings of the 8th annual conference on Computer graphics and interactive techniques**, Volume 15 Issue 3

Full text available:  pdf(1.34 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

The task of assembling drawings and backgrounds together for each frame of an animated sequence has always been a tedious undertaking using conventional animation camera stands and has contributed to the high cost of animation production. In addition, the physical limitations that these camera stands place on the manipulation of the individual artwork levels restricts the total image-making possibilities afforded by traditional cartoon animation. Documents containing all frame assembly info ...

Keywords: Computer animation, Computer graphics, Merging, Transformation

19 Real-time incremental visualization of dynamic ultrasound volumes using parallel BSP trees

William F. Garrett, Henry Fuchs, Mary C. Whitton, Andrei State

October 1996 **Proceedings of the 7th conference on Visualization '96**

Full text available:  pdf(965.61 KB)

Additional Information: [full citation](#), [references](#), [index terms](#)

 [Publisher Site](#)

Keywords: 3D medical imaging, BSP tree, augmented reality, ultrasound echography

20 EXACT: algorithm and hardware architecture for an improved A-buffer

Andreas Schilling, Wolfgang Straßer

September 1993 **Proceedings of the 20th annual conference on Computer graphics and interactive techniques**

Full text available:  pdf(221.33 KB) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

Keywords: A-buffer, anti-aliasing, exact area coverage calculation, priority-masks

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Best 200 shown

Relevance scale ☐ ☐ ☐ ☐ ☐**21** [Face recognition: A literature survey](#)

W. Zhao, R. Chellappa, P. J. Phillips, A. Rosenfeld

December 2003 **ACM Computing Surveys (CSUR)**, Volume 35 Issue 4

Full text available: pdf(4.28 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

As one of the most successful applications of image analysis and understanding, face recognition has recently received significant attention, especially during the past several years. At least two reasons account for this trend: the first is the wide range of commercial and law enforcement applications, and the second is the availability of feasible technologies after 30 years of research. Even though current machine recognition systems have reached a certain level of maturity, their success is ...

Keywords: Face recognition, person identification**22** [Rendering interactive holographic images](#)

Mark Lucente, Tinsley A. Galyean

September 1995 **Proceedings of the 22nd annual conference on Computer graphics and interactive techniques**

Full text available: pdf(125.75 KB)

Additional Information: [full citation](#), [references](#), [index terms](#)

ps(1.02 MB)

23 [A volume density optical model](#)

Peter L. Williams, Nelson Max

December 1992 **Proceedings of the 1992 workshop on Volume visualization**

Full text available: pdf(807.78 KB)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)**24** [Model-based object recognition in dense-range images—a review](#)

Farshid Arman, J. K. Aggarwal

March 1993 **ACM Computing Surveys (CSUR)**, Volume 25 Issue 1

Full text available: pdf(3.42 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

The goal in computer vision systems is to analyze data collected from the environment and


derive an interpretation to complete a specified task. Vision system tasks may be divided into data acquisition, low-level processing, representation, model construction, and matching subtasks. This paper presents a comprehensive survey of model-based vision systems using dense-range images. A comprehensive survey of the recent publications in each subtask pertaining to dense-range image object recogni ...

Keywords: 3D object recognition, 3D representations, CAD-based vision, dense-range images, image understanding

25 Fast sliding thin slab volume visualization

Shin Yi Yen, Sandy Napel, Geoffrey D. Rubin

October 1996 **Proceedings of the 1996 symposium on Volume visualization**

Full text available:  pdf(2.44 MB)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)



26 QuickTime VR: an image-based approach to virtual environment navigation

Shenchang Eric Chen

September 1995 **Proceedings of the 22nd annual conference on Computer graphics and interactive techniques**

Full text available:  pdf(347.59 KB)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)




Keywords: environment maps, image registration, image warping, panoramic images, real-time display, view interpolation, virtual reality

27 Display Devices: Life-sized projector-based dioramas

Kok-Lim Low, Greg Welch, Anselmo Lastra, Henry Fuchs

November 2001 **Proceedings of the ACM symposium on Virtual reality software and technology**

Full text available:  pdf(1.09 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)



We introduce an idea and some preliminary results for a new projector-based approach to re-creating real and imagined sites. Our goal is to achieve re-creations that are both visually and spatially realistic, providing a small number of relatively unencumbered users with a strong sense of immersion as they jointly *walkaround* the virtual site. Rather than using head-mounted or general-purpose projector-based displays, our idea builds on previous projector-based work on *spatially-augmented* ...

Keywords: *augmented virtuality, diorama, immersive visualization, multiprojector display system, shader lamp, spatially-augmented reality, user interface, virtual environment, virtual reality*

28 Lightfield acquisition & display: Synthetic aperture confocal imaging

Marc Levoy, Billy Chen, Vaibhav Vaish, Mark Horowitz, Ian McDowall, Mark Bolas

August 2004 **ACM Transactions on Graphics (TOG)**, Volume 23 Issue 3

Full text available:  pdf(995.29 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)



Confocal microscopy is a family of imaging techniques that employ focused patterned illumination and synchronized imaging to create cross-sectional views of 3D biological specimens. In this paper, we adapt confocal imaging to large-scale scenes by replacing the optical apertures used in microscopy with arrays of real or virtual video projectors and

cameras. Our prototype implementation uses a video projector, a camera, and an array of mirrors. Using this implementation, we explore confocal imagi ...

Keywords: Light fields, camera arrays, coded aperture, confocal microscopy, projector arrays, shaped illumination, synthetic aperture

29 Cloth and filtering: The trilateral filter for high contrast images and meshes

Prasun Choudhury, Jack Tumblin

June 2003 **Proceedings of the 14th Eurographics workshop on Rendering**

Full text available:  [pdf\(2.10 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We present a new, single-pass nonlinear filter for edge-preserving smoothing and visual detail removal for N dimensional signals in computer graphics, image processing and computer vision applications. Built from two modified forms of Tomasi and Manduchi's bilateral filter, the new "trilateral" filter smoothes signals towards a sharply-bounded, piecewise-linear approximation. Unlike bilateral filters or anisotropic diffusion methods that smooth towards piecewise constant solutions, the tr ...

30 Continuous tone representation of three-dimensional objects illuminated by sky light

Tomoyuki Nishita, Eiichi Nakamae

August 1986 **ACM SIGGRAPH Computer Graphics , Proceedings of the 13th annual conference on Computer graphics and interactive techniques**, Volume 20 Issue 4

Full text available:  [pdf\(3.81 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Natural lighting models to date have been limited to calculation of direct sunlight. However, this paper proposes an improved model for natural lighting calculations that adequately considers both direct sunlight and scattered light caused by clouds and other forms of water vapor in the air. Such indirect natural light is termed skylight and can be an important factor when attempting to render realistic looking images as they might appear under overcast skies. In the proposed natural lighting mod ...

31 4-D display of meteorological data

William L. Hibbard

January 1987 **Proceedings of the 1986 workshop on Interactive 3D graphics**

Full text available:  [pdf\(5.40 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

The Man-computer Interactive Data Access System (McIDAS) developed at the University of Wisconsin-Madison Space Science and Engineering Center (UW-SSEC) collects large quantities of meteorological data in real time for storage, analysis and display on multi-frame video terminals. Software is being developed on the McIDAS system which produces 3-D images from a variety of meteorological data for stereo display in short animation sequences. These animation sequences are produced in a few minu ...

32 Efficient image-based methods for rendering soft shadows

Maneesh Agrawala, Ravi Ramamoorthi, Alan Heirich, Laurent Moll

July 2000 **Proceedings of the 27th annual conference on Computer graphics and interactive techniques**

Full text available:  [pdf\(11.36 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We present two efficient image-based approaches for computation and display of high-quality soft shadows from area light sources. Our methods are related to shadow maps and provide the associated benefits. The computation time and memory requirements for

adding soft shadows to an image depend on image size and the number of lights, not geometric scene complexity. We also show that because area light sources are localized in space, soft shadow computations are particularly well suited to im ...

Keywords: image-based rendering, raytracing, shadows

33 A generalized object display processor architecture

Samuel M. Goldwasser

January 1984 **ACM SIGARCH Computer Architecture News , Proceedings of the 11th annual international symposium on Computer architecture**, Volume 12 Issue 3

Full text available:  pdf(974.42 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

A multiprocessor architecture has been developed which addresses the problem of the display and manipulation of multiple shaded three dimensional objects derived from empirical data on a raster scan CRT. Fully general control of such parameters as position, size, orientation, rotation, tone scale, and shading are accomplished at video rates permitting real-time interaction with the display presentation. The GODPA architecture is based on a large number of relatively simple proces ...

34 Rendering and animation of gaseous phenomena by combining fast volume and scanline A-buffer techniques

D. S. Ebert, Richard E. Parent

September 1990 **ACM SIGGRAPH Computer Graphics , Proceedings of the 17th annual conference on Computer graphics and interactive techniques**, Volume 24 Issue 4

Full text available:  pdf(8.65 MB)


Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

This paper describes a new technique that efficiently combines volume rendering and scanline a-buffer techniques. This technique is useful for combining all types of volume-rendered objects with scanline rendered objects and is especially useful for rendering scenes containing gaseous phenomena such as clouds, fog, and smoke. The rendering and animation of these phenomena has been a difficult problem in computer graphics. A new algorithm for realistically modeling and animating gaseous phenomena ...

35 Merging virtual objects with the real world: seeing ultrasound imagery within the patient

Michael Bajura, Henry Fuchs, Ryutarou Ohbuchi

July 1992 **ACM SIGGRAPH Computer Graphics , Proceedings of the 19th annual conference on Computer graphics and interactive techniques**, Volume 26 Issue 2

Full text available:  pdf(4.58 MB)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

Keywords: 3D medical imaging, see-through head-mounted display, ultrasound echography, virtual reality

36 Video-based rendering: Video tooning

Jue Wang, Yingqing Xu, Heung-Yeung Shum, Michael F. Cohen

August 2004 **ACM Transactions on Graphics (TOG)**, Volume 23 Issue 3

Full text available:  pdf(1.12 MB)

Additional Information: [full citation](#), [abstract](#), [references](#)

We describe a system for transforming an input video into a highly abstracted, spatio-temporally coherent cartoon animation with a range of styles. To achieve this, we treat video as a space-time volume of image data. We have developed an anisotropic kernel


mean shift technique to segment the video data into contiguous volumes. These provide a simple cartoon style in themselves, but more importantly provide the capability to semi-automatically rotoscope semantically meaningful regions. In our sys ...

37 Session P14: biomedical applications: Variational classification for visualization of 3D ultrasound data

Raanan Fattal, Dani Lischinski

October 2001 **Proceedings of the conference on Visualization '01**

Full text available:  pdf(992.67 KB)

 Publisher Site

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We present a new technique for visualizing surfaces from 3D ultrasound data. 3D ultrasound datasets are typically fuzzy, contain a substantial amount of noise and speckle, and suffer from several other problems that make extraction of continuous and smooth surfaces extremely difficult. We propose a novel opacity classification algorithm for 3D ultrasound datasets, based on the variational principle. More specifically, we compute a volumetric opacity function that optimally satisfies a set of sim ...

Keywords: 3D ultrasound, classification, isosurface extraction, opacity function, splatting, the variational principle, volume rendering

38 Posters: Perceptual user interfaces using vision-based eye tracking

Ravikrishna Ruddaraju, Antonio Haro, Kris Nagel, Quan T. Tran, Irfan A. Essa, Gregory Abowd, Elizabeth D. Mynatt

November 2003 **Proceedings of the 5th international conference on Multimodal interfaces**

Full text available:  pdf(827.86 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We present a multi-camera vision-based eye tracking method to robustly locate and track user's eyes as they interact with an application. We propose enhancements to various vision-based eye-tracking approaches, which include (a) the use of multiple cameras to estimate head pose and increase coverage of the sensors and (b) the use of probabilistic measures incorporating Fisher's linear discriminant to robustly track the eyes under varying lighting conditions in real-time. We present experiments a ...

Keywords: Fisher's Discriminant Analysis, computer vision, eye tracking, human computer interaction, multiple cameras

39 Industrial sessions: big data: The SDSS skyserver: public access to the sloan digital sky server data

Alexander S. Szalay, Jim Gray, Ani R. Thakar, Peter Z. Kunszt, Tanu Malik, Jordan Raddick, Christopher Stoughton, Jan vandenBerg

June 2002 **Proceedings of the 2002 ACM SIGMOD international conference on Management of data**

Full text available:  pdf(1.48 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

The SkyServer provides Internet access to the public Sloan Digital Sky Survey (SDSS) data for both astronomers and for science education. This paper describes the SkyServer goals and architecture. It also describes our experience operating the SkyServer on the Internet. The SDSS data is public and well-documented so it makes a good test platform for research on database algorithms and performance.

40 Fake fur rendering

Dan B. Goldman

August 1997 **Proceedings of the 24th annual conference on Computer graphics and interactive techniques**

Full text available:  [pdf\(223.80 KB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

Keywords: animals, anisotropic shading, fur, natural phenomena

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41 [Research directions in virtual environments: report of an NSF Invitational Workshop, March 23-24, 1992, University of North Carolina at Chapel Hill](#)

Gary Bishop, Henry Fuchs

August 1992 **ACM SIGGRAPH Computer Graphics**, Volume 26 Issue 3Full text available: [pdf\(2.33 MB\)](#)Additional Information: [full citation](#), [citations](#), [index terms](#)

42 [Anti-aliasing in topological color spaces](#)

Kenneth Turkowski

August 1986 **ACM SIGGRAPH Computer Graphics, Proceedings of the 13th annual conference on Computer graphics and interactive techniques**, Volume 20 Issue 4Full text available: [pdf\(5.19 MB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

The power of a color space to perform well in interpolation problems such as anti-aliasing and smooth-shading is dependent on the topology of the color space as well as the number of elements it contains. We develop the *Major-minor* color space, which has a topology and representation that lends itself to simple anti-aliasing computations between elements of an arbitrary set of colors in an inexpensive frame store.

43 [Life before the chips: simulating digital video interactive technology](#)

Douglas Dixon

July 1989 **Communications of the ACM**, Volume 32 Issue 7Full text available: [pdf\(3.52 MB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

Advances in computers, such as DVI technology, are driven by new hardware functionality—more magic in the silicon. But before the chips came the ideas, and years of visual and interactive technical simulations to evaluate product designs and build the support necessary to develop them.

44 [Superior augmented reality registration by integrating landmark tracking and magnetic tracking](#)


Andrei State, Gentaro Hirota, David T. Chen, William F. Garrett, Mark A. Livingston

August 1996 **Proceedings of the 23rd annual conference on Computer graphics and interactive techniques**

Full text available:

Additional Information:





 [pdf\(1.43 MB\)](#)[full citation](#), [references](#), [citations](#), [index terms](#)

Keywords: augmented reality, calibration, frame buffer techniques, registration, stereo video see-through head-mounted display

45 [A clustering algorithm for radiosity in complex environments](#)

Brian Smits, James Arvo, Donald Greenberg

July 1994 **Proceedings of the 21st annual conference on Computer graphics and interactive techniques**

Full text available:  [pdf\(92.72 KB\)](#)  Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)
[ps\(204.24 KB\)](#)

We present an approach for accelerating hierarchical radiosity by clustering objects. Previous approaches constructed effective hierarchies by subdividing surfaces, but could not exploit a hierarchical grouping on existing surfaces. This limitation resulted in an excessive number of initial links in complex environments. Initial linking is potentially the most expensive portion of hierarchical radiosity algorithms, and constrains the complexity of the environments that can be simulated. The ...

Keywords: clustering, error bounds, global illumination, hierarchical radiosity

46 [A Characterization of Ten Hidden-Surface Algorithms](#)

Evan E. Sutherland, Robert F. Sproull, Robert A. Schumacker

January 1974 **ACM Computing Surveys (CSUR)**, Volume 6 Issue 1

Full text available:  [pdf\(4.47 MB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

47 [Beam tracing polygonal objects](#)

Paul S. Heckbert, Pat Hanrahan

January 1984 **ACM SIGGRAPH Computer Graphics , Proceedings of the 11th annual conference on Computer graphics and interactive techniques**, Volume 18 Issue 3

Full text available:  [pdf\(929.75 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Ray tracing has produced some of the most realistic computer generated pictures to date. They contain surface texturing, local shading, shadows, reflections and refractions. The major disadvantage of ray tracing results from its point-sampling approach. Because calculation proceeds ab initio at each pixel it is very CPU intensive and may contain noticeable aliasing artifacts. It is difficult to take advantage of spatial coherence because the shapes of reflections and refrac ...

Keywords: Coherence, Object space, Polygon, Ray tracing, Refraction

48 [Hardware antialiasing of lines and polygons](#)

Walter Gish, Allen Tanner

June 1992 **Proceedings of the 1992 symposium on Interactive 3D graphics**

Full text available:  [pdf\(1.39 MB\)](#) Additional Information: [full citation](#), [references](#), [index terms](#)

49 Texture mapping: Resample hardware for 3D graphics


Koen Meinds, Bart Barenbrug

September 2002 **Proceedings of the ACM SIGGRAPH/EUROGRAPHICS conference on Graphics hardware**Full text available:  [pdf\(909.72 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Texture mapping is a core technology of current real-time 3D graphics systems. To avoid aliasing artifacts, the texture mapping resample process requires proper filtering. We present a new resample algorithm for two-pass forward texture mapping that is suited to an efficient hardware implementation. This method delivers high quality anti-aliased images using filter techniques based on digital signal processing. We use an input sample driven texture resample and filtering algorithm that "splats" ...

50 Draft Proposed: American National Standard—Graphical Kernel System

Technical Committee X3H3 - Computer Graphics

February 1984 **ACM SIGGRAPH Computer Graphics**, Volume 18 Issue SIFull text available:  [pdf\(16.07 MB\)](#) Additional Information: [full citation](#)**51 Visibility culling using hierarchical occlusion maps**


Hansong Zhang, Dinesh Manocha, Tom Hudson, Kenneth E. Hoff

August 1997 **Proceedings of the 24th annual conference on Computer graphics and interactive techniques**Full text available:  [pdf\(597.69 KB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

Keywords: hierarchical data structures, image pyramid, interactive display, occlusion culling, visibility culling

52 The WarpEngine: an architecture for the post-polygonal age

Voicu Popescu, John Eyles, Anselmo Lastra, Joshua Steinhurst, Nick England, Lars Nyland


July 2000 **Proceedings of the 27th annual conference on Computer graphics and interactive techniques**Full text available:  [pdf\(298.54 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We present the WarpEngine, an architecture designed for real-time imaged-based rendering of natural scenes from arbitrary viewpoints. The modeling primitives are real-world images with per-pixel depth. Currently they are acquired and stored off-line; in the near future real-time depth-image acquisition will be possible, the WarpEngine is designed to render in immediate mode from such data sources. The depth-image resolution is locally adapted by interpolation to match the resolution ...

Keywords: graphics hardware, image-based rendering

53 Some raster graphics extensions to the Core System

James D. Foley, James N. Templeman, Dara Dastyar

August 1979 **ACM SIGGRAPH Computer Graphics, Proceedings of the 6th annual conference on Computer graphics and interactive techniques**, Volume 13 Issue 2Full text available:  [pdf\(1.52 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)


The Core System is a proposed standard subroutine package for line-drawing graphics. We present some Core System extensions for use with raster graphics equipment. The extensions, which are upward-compatible with the present Core System, provide filled polygons, display of arrays of pixels, use of a color look-up table, and hidden-surface or hidden-edge removal. The extensions are being intergrated into an existing Core System implementation.

Keywords: Core system, Interactive graphics, Raster displays

54 Efficient alias-free rendering using bit-masks and look-up tables

Greg Abram, Lee Westover

July 1985 **ACM SIGGRAPH Computer Graphics , Proceedings of the 12th annual conference on Computer graphics and interactive techniques**, Volume 19 Issue 3

Full text available:  pdf(2.30 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citing](#), [index terms](#)



We demonstrate an efficient method of rendering alias-free synthetic images using precomputed convolution integrals. The method is based on the observation that a *visible polygon fragment's contribution* to an *image* is solely a function of its position and shape, and that within a reasonable level of accuracy, a limited number of shapes represent the majority of cases encountered in *images commonly rendered*. The convolution integral is precomputed for all pixels affected by th ...

Keywords: anti-aliasing, image synthesis

55 Pixel masks for screen-door transparency

Jurriaan D. Mulder, Frans C. A. Groen, Jarke J. van Wijk

October 1998 **Proceedings of the conference on Visualization '98**

Full text available:  pdf(1.71 MB) 
[Publisher Site](#)

Additional Information: [full citation](#), [references](#), [citing](#), [index terms](#)

Keywords: screen-door transparency

56 A parallel processor system for three-dimensional color graphics

Haruo Niimi, Yoshirou Imai, Masayoshi Murakami, Shinji Tomita, Hiroshi Hagiwara

January 1984 **ACM SIGGRAPH Computer Graphics , Proceedings of the 11th annual conference on Computer graphics and interactive techniques**, Volume 18 Issue 3

Full text available:  pdf(892.77 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citing](#), [index terms](#)

This paper describes the hardware architecture and the employed algorithm of a parallel processor system for three-dimensional color graphics. The design goal of the system is to generate realistic images of three-dimensional environments on a raster-scan video display in real-time. In order to achieve this goal, the system is constructed as a two-level hierarchical multi-processor system which is particularly suited to incorporate scan-line algorithm for hidden surface elimination. The sys ...

57 The Quadtree and Related Hierarchical Data Structures

Hanan Samet



June 1984 **ACM Computing Surveys (CSUR)**, Volume 16 Issue 2

Full text available:  pdf(4.87 MB) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

58 Zippered polygon meshes from range images

Greg Turk, Marc Levoy

July 1994 **Proceedings of the 21st annual conference on Computer graphics and interactive techniques**

Full text available:  pdf(62.55 KB)  ps(259.20 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)


Range imaging offers an inexpensive and accurate means for digitizing the shape of three-dimensional objects. Because most objects self occlude, no single range image suffices to describe the entire object. We present a method for combining a collection of range images into a single polygonal mesh that completely describes an object to the extent that it is visible from the outside. The steps in our method are: 1) align the meshes with each other using a modified iterated closest- ...

Keywords: polygon mesh, range images, structured light range scanner, surface fitting, surface reconstruction

59 A hidden-surface algorithm with anti-aliasing

Edwin Catmull

August 1978 **ACM SIGGRAPH Computer Graphics , Proceedings of the 5th annual conference on Computer graphics and interactive techniques**, Volume 12 Issue 3

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In recent years we have gained understanding about aliasing in computer generated pictures and about methods for reducing the symptoms of aliasing. The chief symptoms are staircasing along edges and objects that pop on and off in time. The method for reducing these symptoms is to filter the image before sampling at the display resolution. One filter that is easy to understand and that works quite effectively is equivalent to integrating the visible intensities over the area that the pixel c ...

Keywords: Aliasing, Clipping, Computer graphics, Filtering, Hidden-surface removal, Sampling

60 The aliasing problem in computer-generated shaded images

Franklin C. Crow

November 1977 **Communications of the ACM**, Volume 20 Issue 11

Full text available:  pdf(924.10 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

Certain defects, such as jagged edges and disappearing detail, have long been an annoyance in digitally generated shaded images. Although increasing the resolution or defocusing the display can attenuate them, an understanding of these defects leads to more effective methods. This paper explains the observed defects in terms of the aliasing phenomenon inherent in sampled signals and discusses prefiltering as a recognized cure. A method for evaluating filters is presented, the application of ...





Keywords: aliasing, computer graphics, convolutional filtering, hidden-surface removal, sampling

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